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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,675	02/03/2006	Yohsuke Kinouchi	126748	2027

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OLIFF & BERRIDGE, PLC
P.O. BOX 19928
ALEXANDRIA, VA 22320

EXAMINER	
FERNANDEZ, KATHERINE L	
ART UNIT	**PAPER NUMBER**
3768	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Office Action Summary	Application No.	Applicant(s)	
	10/565,675	KINOUCHI ET AL.	
	Examiner	Art Unit	
	Katherine L. Fernandez	3768	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 2/3/06.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-12 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-12 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 24 January 2006 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 1/24/06.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The Information Disclosure Statement filed on January 24, 2006 is acknowledged. The Information Disclosure Statement meets the requirements of 37 C.F.R. 1.97 and 1.98 and therefore the references therein have been considered.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-2,5, 7-8, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Bonnefous et al. (US Patent NO. 5,891,039).

With regards to claims 1,5,7,11 Bonnefous et al. disclose a blood-vessel shape measuring apparatus comprising: a supersonic-wave probe including a first array (3) including a plurality of first supersonic-wave elements arranged in one direction; a second array (4) including a plurality of second supersonic-wave elements arranged in a direction parallel to said one direction, the apparatus measuring a shape of a blood vessel of a living being, based on echo signals detected by first and second arrays that are placed on a skin of the living being such that each of the first and second array is across the blood vessel located under the skin, and a Doppler supersonic-wave

element, the supersonic wave probe being worn such that each of the first and second arrays is across a blood vessel located under a skin of a living being and a direction in which the Doppler supersonic-wave element emits a supersonic wave has an acute angle with respect to the blood vessel (column 3, line 23 through column 4, line 28); a first wall-position calculating means for calculating, based on respective reflection signals detected by the first supersonic-wave elements of the first array, respective positions of respective portions of a wall of the blood vessel that are located right below the first array and correspond to the first supersonic-wave elements; a second wall-position calculating means for calculating, based on respective echo signals detected by the second supersonic-wave elements of the second array, respective positions of respective portions of the wall of the blood vessel that are located right below the second array and correspond to the second supersonic-wave elements (column 6, lines 39-55, referring to a second stage for reception and processing and a third stage for signal processing of ultrasonic signals returned to the probe; column 5, lines 22-52; column 4, lines 57-64, referring to traces 26 and 27 which represent the walls of the artery); and a blood-vessel shape calculating means for calculating a shape of the blood vessel on an orthogonal section thereof, based on the respective positions of the respective portions of the wall of the blood vessel that correspond to the first supersonic-wave elements and are calculated by the first wall-position calculating means, and the respective positions of the respective portions of the wall of the blood vessel that correspond to the first supersonic-wave elements and are calculated by the second wall-position calculating means (column 4, lines 29-37; column 6, lines 16-26).

See Figures 1-2, 4 and 5. Their system further includes a blood-flow velocity calculating means for calculating, based on a Doppler reflection wave which is obtained when the Doppler supersonic-wave element emits the supersonic wave toward the blood vessel and which is changed by a Doppler effect based on a velocity of a blood flow in the blood vessel, the velocity of the blood flow (column 4, lines 11-28); a center-axis calculating means for calculating, based on the respective positions of the respective portions of the wall of the blood vessel that correspond to the first supersonic wave elements and are calculated by the first wall-position calculating means, and the respective positions of the respective portions of the wall of the blood vessel that correspond to the second supersonic-wave elements and are calculated by the second wall-position calculating means, respective center points of respective sections of the wall of the blood vessel on the respective measuring sections of the first and second arrays, and calculating a center axis of the blood vessel, based on the respective center points of the respective sections of the wall of the blood vessel on the respective measuring sections of the first and second arrays (column 3, line 66 through column 4, line 64); a relative-angle calculating means for calculating an actual relative angle between the center axis of the blood vessel, calculated by the center axis calculating means, and the direction in which the Doppler supersonic-wave element emits the supersonic wave toward the blood vessel (column 4, lines 46-51); and a blood-flow velocity correcting means for correcting, based on the actual relative angle calculated by the relative-angle calculating means, the velocity of the blood flow calculated by the blood-flow velocity calculating means (column 4, lines 47-57).

With regards to claims 2 and 8, Bonnefous et al. further disclose that the first wall-position calculating means calculates respective distances to the respective portions of the wall of the blood vessel, based on respective time differences between respective emission signals emitted by the first supersonic-wave elements and the respective reflection signals from the respective portions of the wall, detected by the first supersonic-wave elements, and determines, based on the calculated respective distances, the respective positions of the wall on a measuring section of the first array, and wherein the second wall-position calculating means calculates respective distances to the respective portions of the wall of the blood vessel, based on respective time differences between respective emission signals emitted by the second supersonic-wave elements and respective reflection signals from the respective portions of the wall, detected by the second supersonic-wave elements, and determines, based on the calculated respective distances, the respective positions of the respective portions of the wall on a measuring section of the second array (column 4, lines 42-64, referring to the measurement of the depth (z) between the traces of the wall (i.e. calculation of distances to the respective portions of the wall of the blood vessel)).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 3 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bonnefous et al..

Bonnefous et al. disclose a measuring-section shape calculating means for calculating, based on the respective positions of the respective portions of the wall of the blood vessel that correspond to the first supersonic-wave elements and are calculated by the first wall-position calculating means, and the respective portions of the respective portions of the wall of the blood vessel that correspond to the second supersonic-wave elements and are calculated by the second wall-position calculating means, a center point (R), and a major-axis length and/or a minor-axis length (13) of each of a section of the wall of the blood vessel on the measuring section of the first array and a section of the wall of the blood vessel on the measuring section of the second array; a center-axis calculating means for calculating a center axis of the blood vessel, based on the respective center points of the respective sections of the wall of the blood vessel on the respective measuring sections of the first and second arrays, calculated by the measuring-section shape calculating means (column 3, line 66 through column 4, line 64). They also calculate a cross-angle calculating means for calculating, based on the center axis of the blood vessel, calculated by the center-axis calculating means, a cross angle at which the orthogonal section of the blood vessel and the measuring section cross each other (column 4, lines 46-51). They also disclose a correcting means for correcting, based on the cross-angle calculated by the cross-angle calculating means, the measured velocity, into a corrected real velocity (column 4, lines 47-57). However, they do not specifically disclose that the correcting means

corrects the major-axis length and/or the minor-axis length calculated. At the time of the invention, it would have been obvious to one of ordinary skill in the art to have the correcting means correct the axis length. The motivation for doing so would have been that if the velocity was corrected for, which requires knowledge of the distance traveled over time, then the distance, which corresponds to the axis length, can be corrected for as well.

7. Claims 4, 6, 10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bonnefous et al. in view of Li (US Pub. No. 2003/0114756).

As discussed above, Bonnefous et al. meet the limitations of claims 3,5,9, and 11. However, they do not specifically disclose that the blood-vessel-shape calculating means comprises an orthogonal-section-area calculating means for calculating an area of the section of the blood vessel on the orthogonal section thereof, based on the corrected major-axis length and the corrected minor-axis length. Li discloses a method and system to accurately estimate the flow volume of a vessel (pg. 1, paragraph [0001]). They disclose that the volume flow rate of blood (i.e. blood flow amount) in a vessel is the blood flow velocity integrated across the area of the blood vessel (pg. 1, paragraph [0005]). As seen in Figure 4, an orthogonal-section-area of the vessel can be calculated (Figure 4, pg. 2, paragraph [0019]). Further, Li discloses that an image processor can calculate the volume flow rate of blood flowing through the blood vessel within the area bounded by the template, thus the processor would be capable of calculating the area of the section of the blood vessel on the orthogonal section (pg. 3, paragraph [0027]). At the time of the invention, it would have been obvious to one of

ordinary skill in the art to have included an orthogonal-section-area calculating means. The motivation for doing so would have been to be able to calculate parameters important for examining the condition of the heart, such as the volume flow rate of blood (i.e. blood flow amount), as taught by Li (pg. 1, paragraphs [0004]-[0005]).

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine L. Fernandez whose telephone number is (571)272-1957. The examiner can normally be reached on 8:30-5, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eleni M. Mantis-Mercader can be reached on (571)272-4740. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BRIAN L. CASLER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700